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## AMENDMENTS TO THE CLAIMS:

**Please amend the claims as follows. Please cancel claims 5-10 and 17-19 without prejudice or disclaimer.**

1. (Currently Amended) A vehicle motion model generating device for generating a vehicle motion model that represents a motion state of a vehicle, comprising:

a first recurrent neural network formed by connecting plural nodes such that an output of a node is input to another node in accordance with a predetermined coupling weight coefficient, comprising a feedback loop ~~feeding back~~ of an output of at least one node, ~~to at least one of said one node and a node other than said one node;~~ and outputting a vehicle parameter indicating said motion state of the vehicle based on predetermined input information, thereby functioning as said vehicle motion model;

plural second recurrent neural networks, each of said second recurrent neural networks formed by connecting second plural nodes such that a second output of a second node is input to another second node in accordance with a second predetermined coupling weight coefficient, comprising a second feedback loop of a second output of at least one second node, and outputting a second vehicle parameter different from said vehicle parameter output from said first recurrent neural network and indicating said motion state of the vehicle based on said predetermined input information, thereby functioning as said vehicle motion model; and

an optimizing unit for determining an optimum solution of said predetermined coupling weight coefficient ~~in~~ of said first recurrent neural network and said second predetermined coupling weight coefficient of said plural second recurrent neural networks

~~said first recurrent neural network~~ based on a learning rule using a hereditary algorithm,

wherein said first recurrent neural network and said plural second recurrent neural networks are mutually connected to each other such that a state variable including a correlation with said vehicle parameter output from said first recurrent neural network is input to each of said plural second recurrent neural networks. ~~outputs a first parameter indicating said motion state of the vehicle based on predetermined input information, thereby functioning as said vehicle motion model.~~

2. (Currently Amended) The vehicle motion model generating device according to claim 1, wherein said state value represents one of a road surface state and a motion state of the vehicle ~~said first recurrent neural network includes a hierarchical structure comprising at least an input layer formed of one or more nodes and an output layer formed of one or more nodes, and said optimizing unit determines said optimum solution of said coupling weight coefficient with connection of respective nodes between neighboring layers being set as a processing target.~~

3. (Currently Amended) The vehicle motion model generating device according to claim 1, wherein said predetermined input information comprises at least one of a steering angle, a steering angular velocity, a steering angular acceleration, a steering reaction force, a vehicle speed, and a vehicle acceleration, and

wherein said vehicle parameter comprises at least three of an estimation value of a yaw rate, an estimation value of lateral acceleration, an estimation value of roll, and an estimation value pitch ~~said first recurrent neural network formed of said plural nodes~~

~~connected mutually so that said output of said one node is input to all the plural nodes including said one node, and respective outputs of said plural nodes are input to said one node, and said optimizing unit determines said optimum solution of said coupling weight coefficient with mutual connection of said plural nodes being set as a processing target.~~

4. (Currently Amended) The vehicle motion model generating device according to claim 1, wherein said first recurrent neural network outputs an estimation value of a yaw rate as said vehicle parameter ~~each of said plural nodes uses one of a sigmoid function and a non-sigmoid function other than said sigmoid function as a transfer function.~~

Claims 5-10 (Canceled.)

11. (Currently Amended) A road surface friction coefficient estimating device for estimating a road surface friction coefficient based on a vehicle motion model that represents a motion state of a vehicle and is generated by a vehicle motion model generating device, wherein said vehicle motion model generating device comprises:

a first recurrent neural network formed by connecting plural nodes such that an output of a node is input to another node in accordance with a predetermined coupling weight coefficient, comprising a feedback loop ~~feeding back~~ of an output of at least one node, ~~to at least one of said one node and a node other than said one node;~~ and outputting a vehicle parameter indicating said motion state of the vehicle of based on a predetermined input information, thereby functioning as said vehicle motion model;

plural second recurrent neural networks, each of said second recurrent neural networks

formed by connecting second plural nodes such that a second output of a second node is input to another second node in accordance with a second predetermined coupling weight coefficient, comprising a second feedback loop of a second output of at least one second node, and outputting a second vehicle parameter different from said vehicle parameter output from said first recurrent neural network and indicating said motion state of the vehicle based on said predetermined input information, thereby functioning as said vehicle motion model; and

an optimizing unit for determining an optimum solution of said predetermined coupling weight coefficient ~~in~~ of said first recurrent neural network and said second predetermined coupling weight coefficient of said plural second recurrent neural networks based on a learning rule using a hereditary algorithm,

wherein said first recurrent neural network and said plural second recurrent neural networks are mutually connected to each other such that a state variable including a correlation with said vehicle parameter output from said first recurrent neural network is input to each of said plural second recurrent neural networks ~~outputs a first parameter indicating said motion state of the vehicle based on predetermined input information, thereby functioning as said vehicle motion model~~.

12. (Currently Amended) A vehicle behavior estimating device for estimating a behavior of a vehicle based on a vehicle motion model that represents a motion state of a vehicle and is generated by a vehicle motion model generating device, wherein said vehicle motion model generating device comprises:

a first recurrent neural network formed by connecting plural nodes such that an output

of a node is input to another node in accordance with a predetermined coupling weight coefficient, comprising a feedback loop ~~feeding back~~ of an output of at least one node, ~~to at least one of said one node and a node other than said one node;~~ and outputting a vehicle parameter indicating of said motion state of the vehicle based on the predetermined input information, thereby functioning as said the vehicle motion model;

plural second recurrent neural networks, each of said second recurrent neural networks are formed by connecting second plural nodes to another second node in accordance with a second predetermined coupling weight coefficient, comprising a second feedback loop of a second output of at least one second node, and outputting a second vehicle parameter different from said vehicle parameter output from said first recurrent neural network and indicating said motion state of the vehicle based on said predetermined input information, thereby functioning as said vehicle motion model; and

an optimizing unit for determining an optimum solution of said predetermined coupling weight coefficient ~~in~~ of said first recurrent neural network and said second predetermined coupling weight coefficient of said plural second recurrent neural networks based on a learning rule using a hereditary algorithm,

wherein said first recurrent neural network and said plural second recurrent neural networks are mutually connected to each other such that a state variable including a correlation with said vehicle parameter output from said first recurrent neural network is input to each of said plural second recurrent neural networks ~~outputs a first parameter indicating said motion state of the vehicle based on predetermined input information, thereby functioning as said vehicle motion model~~.

13. (Currently Amended) A method for generating a vehicle motion model that represents a motion state of a vehicle, wherein a first recurrent neural network formed by connecting plural nodes such that an output of a node is input to another node in accordance with a predetermined coupling weight coefficient and includes a feedback loop ~~feeding back~~ of an output of at least one node, ~~to at least one of said one node and a node other than said one node,~~ and plural second recurrent neural networks each formed by connecting the second plural nodes such that a second output of a second node is input to another second node in accordance with a second predetermined coupling wake coefficient and includes a second feedback loop of a second output of at least one second node, said method being executed by a computer, and said method comprising:

determining an optimum solution of a genetic type based on a learning rule using a hereditary algorithm while setting said predetermined coupling weight coefficient ~~in~~ of said first recurrent neural network and said second predetermined coupling weight coefficient of said plurality of second recurrent neural networks as said genetic type; ~~and~~

outputting an optimum solution of said predetermined coupling weight coefficient to said first recurrent neural network based on said optimum solution of said genetic type[[,]];

outputting a second optimum solution of said second predetermined coupling weight coefficient to said plurality of second recurrent neural networks based on said optimum solution of said genetic type;

outputting a first vehicle parameter from said first recurrent neural network indicating said motion state of the vehicle based on predetermined input information, and outputting at least one second vehicle parameter from said plurality of second recurrent neural networks indicating said motion state of the vehicle based on said predetermined input information,

~~wherein said first recurrent neural network outputs a parameter indicating said motion state of the vehicle based on predetermined input information,~~ thereby functioning as said vehicle motion model; and

outputting a state variable from said first recurrent neural network to each of said plural second recurrent neural networks, said state variable including a correlation with said first vehicle parameter.

14. (Currently Amended) The method according to claim 13, wherein said state value represents one of a road surface state and a motion state of the vehicle. ~~said first recurrent neural network includes a hierarchical structure including at least an input layer comprising one or more nodes and an output layer formed of one or more nodes, and wherein said determining said optimum solution of said genetic type comprises determining said optimum solution of said genetic type while connection of respective nodes between neighboring layers is set as a processing target.~~

15. (Currently Amended) The method according to claim 13, wherein said predetermined input information comprises at least one of a steering angle, a steering angular velocity, a steering angular acceleration, a steering reaction force, a vehicle speed, and a vehicle acceleration, and

wherein said second vehicle parameters comprise at least three of an estimation value of a yaw rate, an estimation value of lateral acceleration, an estimation value of roll, and an estimation value pitch. ~~said first recurrent neural network formed of said plural nodes connected mutually so that said output of said one node is input to all the plural nodes~~

~~including said one node, and respective outputs of said plural nodes are input to said one node, and wherein said determining said optimum solution of said coupling weight coefficient comprises determining said optimum solution of said coupling weight coefficient while mutual connection of respective nodes is set as a processing target.~~

16. (Currently Amended) The method according to claim 13, comprising:

outputting an estimation value of a yaw rate as said first vehicle parameter by said first recurrent neural network. ~~wherein a second recurrent neural network is constructed as a network different from said first recurrent neural network, and functions as the vehicle motion model by outputting a second parameter indicating a motion state of the vehicle different from said first parameter, said method further comprising:~~

~~determining the optimum solution of the genetic type while setting the coupling weight coefficient in said second recurrent neural network as said genetic type; and~~

~~outputting said optimum solution of said coupling weight coefficient to said second recurrent neural network based on said optimum solution of said genetic type.~~

Claims 17-19 (Canceled.)